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09/338,520	06/23/99	JIN	S 2925-0329P

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EXAMINER

CLOVE, T

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 08/28/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

## Office Action Summary

Application No.

09/338,520

Applicant(s)

JIN ET AL.

Examiner

Thelma S Clove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 23-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

The inventions are distinct, each from the other because of the following reasons:

1. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the substrate does not have to be prepared before the buffer is applied.
2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-22, drawn to a thermionic cathode, classified in class 313, subclass 346R.
3. Claims 23-35, drawn to a method for making a thermionic cathode, classified in class 445, subclass 50.
4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
5. During a telephone conversation with John Castelleno (Reg. No. 35094) on 6/29/01 a provisional election was made with traverse to prosecute the invention of a thermionic cathode, claims 1-22. Affirmation of this election must be made by applicant

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in replying to this Office action. Claims 23-35 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Drawings***

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 114 in figure 5. Correction is required.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

9. Claims 1, 7, and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Saito et al. (US 6124666).

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10. Regarding claim 1, Saito et al. teach a cathode formed on a substrate with a buffer layer of an alloy of at least one of tungsten, molybdenum, and tantalum, and an emissive layer (in column 3 lines 13-25).
11. Regarding claim 7, Saito et al. teach a cathode according to claim 1, wherein the buffer and substrate are from a similar chemical class (in column 3 lines 15-20).
12. Regarding claim 9, Saito et al. teaches a cathode according to claim 1, and shows an embodiment, wherein the cathode is curved (in figure1).
13. Regarding claims 10-12, Saito et al. teach the buffer as a solid solution, and the buffer comprising at least one of tungsten, molybdenum, and tantalum (in column 6 lines 11-13 and column 3 lines 17-20).
14. Claims 2-6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Frank et al. (US 4522852).
15. Regarding claims 2 and 3, Frank et al. teach a thermionic cathode comprising a substrate, an emissive layer, and a buffer located between the substrate and emissive layer wherein the buffer protects from grain growth and destruction of the preferred crystallographic orientation (in column 4 lines 49-59, column 5 lines 5-6, 29-31 and 49-52 and column 7 lines 30-33).
16. Regarding claim 4, Frank et al. teach a cathode according to claim 3, wherein the grain sizes of the grains at the surface of the substrate are preferred to be 1 micrometer or less (in column 7 lines 60-61).

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17. Regarding claims 5 and 6, Frank et al. teach a cathode according to claim 1, wherein the buffer inhibits the growth in the base and the emitting layers (in column 7 lines 30-34).

18. Regarding claim 8, Frank et al. teach a cathode wherein the base and buffer layer are both refractory metals (in column 5 lines 5-6 and column 7 lines 30-34).

***Claim Rejections - 35 USC § 103***

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 6124666) in view of Frank et al. (US 4533852).

21. Regarding claim 13, Saito et al. teach a cathode according to claim 12.

22. Saito et al. do not teach a cathode wherein the substrate and emissive layer are made of tantalum.

23. Frank et al. teach a thermionic cathode comprising a base layer, a grain growth inhibiting buffer layer, and an emissive layer, wherein the base layer and emissive layer are both made of tantalum (in column 2 lines 56-59, column 4 lines 49-51, 57-65, column 5 lines 5-6, and column 7 lines 30-33).

24. Frank et al. teach that the cathode has a long life, high emitter concentration, and high mechanical stability (in column 12 lines 29-31).

25. It would have been obvious for one of ordinary skill in the art at the time the invention was made to use the tantalum substrate and emissive layer of Frank et al. in the cathode of Saito et al. since the cathode of Frank et al. has high emitter concentration and a long lifetime as taught by Frank et al.

26. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 6124666) as applied to claim 1 above, and further in view of Krijn (US 6236052).

27. Saito et al. teach a thermionic cathode according to claim 1.

28. Saito et al. do not teach a thermionic cathode used as part of a projection electron lithography system wherein the system is a SCALPEL™ system.

29. Krijn teaches a SCALPEL™ projection electron lithography system with an electron beam source (in column 1 lines 66-67 and column 4 lines 21-25).

30. Saito et al. teaches that the cathode with the buffer layer has improved lifetime characteristics (in column 2 lines 63-67).

31. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the thermionic cathode of Saito et al. in the SCALPEL™ projection electron lithography system taught by Krijn since the thermionic cathode of Saito et al. has improved lifetime characteristics as taught by Saito et al.

32. Claims 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frank et al. (US 4533852) in view of Saito et al. (US 6124666).

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33. Regarding claims 16-22, Frank et al. teach a cathode according to claim 5, wherein the buffer includes a buffer layer including rhenium (in column 9 lines 2-4) and Ru, wherein the layer prevents the grain size from becoming too large through recrystallization (in column 11 lines 14-21).

34. Regarding claims 17 and 18, Frank et al. do not teach an alloyed buffer comprising at least two elements.

35. Regarding claim 21, Frank et al. do not teach the buffer comprising tantalum.

36. Saito et al. teach a cathode with a substrate, an emissive layer and an alloy buffer layer of at least one of tantalum, tungsten, or molybdenum (in column 3 lines 18-20).

37. Saito et al. teach that the buffer layer helps improve the current density (in column 4 lines 17-19).

38. It would have been obvious to use the alloyed buffer of Saito et al. in the cathode of Frank et al. since the alloyed buffer of Saito et al. helps improve the current density as taught by Saito et al.

39. Regarding claim 22, Frank et al. teach a thermionic cathode comprising a base layer, a grain growth inhibiting buffer layer, and an emissive layer, wherein the base layer and emissive layer are both made of tantalum (in column 2 lines 56-59, column 4 lines 49-51, 57-65, column 5 lines 5-6, and column 7 lines 30-33).

### ***Conclusion***



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40. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bachmann et al. (US 4083811) and Takanashi et al. (US 4184100).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thelma S Clove whose telephone number is (703) 308-6548. The examiner can normally be reached on Monday-Friday from 8 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



TSC  
August 14, 2001

  
VIP PATEL  
PRIMARY EXAMINER